

## A new name, clarification of synonymy, and a new subspecies for *Isopogon* (Proteaceae) in Western Australia

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### Abstract

Rye, B.L. & Macfarlane, T.D. A new name, clarification of synonymy, and a new subspecies for *Isopogon* (Proteaceae) in Western Australia. *Nuytsia* 30: 309–316 (2019). *Isopogon drummondii* Benth. *nom. illeg.* is lectotypified and replaced by the new name *I. autumnalis* Rye & T. Macfarlane while *I. drummondii* Hügel ex Jacques is recognised as a probable synonym of *I. sphaerocephalus* Lindl. The new subspecies *I. sphaerocephalus* subsp. *lesueurensis* Rye is described.

### Introduction

This paper undertakes to settle the uncertainty around the name of a Western Australian species of *Isopogon* R.Br. (Proteaceae), the solution to which involves a second species, in which a new subspecies is recognised.

In his treatment of *Isopogon* for the *Flora of Australia*, Foreman (1995) described one species as *I. sp. A* because he was uncertain whether the name *I. drummondii* Hügel ex Jacques (Jacques 1843) applied to it. A later-published name with the same epithet, *I. drummondii* Benth. (Bentham 1870), does apply to Foreman's species A but cannot be used because it is an illegitimate later homonym.

The name *I. drummondii* Hügel ex Jacques was not mentioned by Bentham (1870), possibly because it was published in a horticultural context. It was based on cultivated plants with no precise locality of origin, has no illustration and evidently lacks a type, problems commonly encountered among Jacques's names. The protologue does not give any information regarding the flowers and fruits of the species but does provide a moderately detailed description of its leaves. Whereas Jacques's species was described as having linear leaves 6–15 cm (i.e. 60–150 mm) long, Bentham's species has terete leaves 20–65 mm long. This difference alone is sufficient to show that they are distinct entities, so *I. drummondii* Benth. needs to be replaced by a new, legitimate name. The new name chosen here is *I. autumnalis* Rye & T. Macfarlane.

A far more likely match for *I. drummondii* Hügel ex Jacques in leaf morphology is *I. sphaerocephalus* Lindl., an attractive species that was collected by James Drummond during the early stages of settlement of the Swan River area of Western Australia. It has a moderately large range from near Gidgegannup to the south coast, with an isolated, distinctive variant occurring much further north near Mt Lesueur. This northern variant is named here as subsp. *lesueurensis* Rye.

## Taxonomy

***Isopogon autumnalis*** Rye & T.Macfarlane, *nom. nov.*

*Isopogon drummondii* Benth., *Fl. Austral.* 5: 344–345 (1870), *nom. illeg.*; *Atylus drummondii* (Benth.) Kuntz, *Revis. Gen.* 2: 577 (1891). *Type citation*: ‘Swan River, Drummond, 1st coll., Preiss’. *Type specimens*: Swan River [Western Australia], 1839, J. Drummond 1st coll., *s.n.* (*lecto*, here designated: K 000736646 image!; *isolecto*: BM 000991907 image!, K 000736645 image!); Swan River [Western Australia], *s. loc.*, J.A.L. Preiss *s.n.* (*syn.* MEL 1531863 image!).

*Isopogon* sp. A; D.B. Foreman, *Fl. Australia* 16: 204 (1995).

[*Isopogon drummondii* *auct. non* Hügel ex Jacques: Council of Heads of Australasian Herbaria, *Australian Plant Census*, <https://biodiversity.org.au/nsi/services/APC> (2006–2019); *FloraBase*, <https://florabase.dpaw.wa.gov.au/> (2006–2019).]

[*Isopogon petrophiloides* *auct. non* R.Br.: C.F. Meissner in J.G.C. Lehmann, *Pl. Preiss* 1: 503 (1845).]

*Illustrations*. W.E. Blackall & B.J. Grieve, *How Know W. Austral. Wildflowers* 1: 146 (1988) [as *Isopogon drummondii*]; D.B. Foreman, *Fl. Australia* 16: 206, fig. 100 (1995) [as *Isopogon* sp. A].

*Shrubs* 0.3–1 m high, commonly 0.5–1 m wide, lignotuberosus. *Young stems* with a very dense, short indumentum of whitish, coiled hairs and also with patent hairs 0.4–0.7 mm long. *Leaves* mostly curved, simple, (20–)30–50(–65) mm long, 1.3–2.1 mm wide, broadest towards the apex, terete and glabrous except for the base, mucronate; petiole or flattened base *c.* 4 mm long, densely coiled-hairy on abaxial surface and sometimes on basal part of adaxial surface; mucro erect, stout, *c.* 1 mm long, pale at first but usually with a dark tip, becoming dark. *Flower heads* solitary, terminal, erect, very broadly or depressed ovoid and 20–35 mm diam. when in full flower (often smaller and broadly ovoid in bud and fruit), with numerous, densely packed involucral and floral bracts and closely surrounded by leaves; bracts very densely hairy outside with long whitish hairs, sometimes with a short, dark, glabrous tip. *Tepals* usually 10–12 mm long, pale yellow; claw covered throughout by widely spreading wavy (curved or loosely curled), silky hairs, separating to just below the base of the pollen presenter, which extends slightly below the base of the limb; limb 3.5–4 mm long, usually ciliate in lower part, with a terminal tuft of hairs 0.3–0.6 mm long, the four parts of the limb becoming curved after separating from one another. *Anthers* 2.3–2.5 mm long including terminal appendage; connective appendage 0.45–0.5 mm long, becoming dark. *Pollen presenter* 3–3.5 mm long, densely and minutely papillose-hairy on the pedestal and swelling, with a slight to obvious constriction separating the pedestal from the much shorter swelling; pedestal slightly to distinctly shorter than the receptor; swelling *c.* 0.3 mm wide; receptor 1.5–2.3 mm long, lacking papillae or with papillae restricted to the base. *Cones* very broadly ovoid; involucral bracts similar to cone scales. *Cone scales* spatulate, up to *c.* 10 mm long, with margin incurved; outer surface very densely villous; inner surface glabrous or sparsely hairy. *Diaspores* ovoid, 5–5.5 mm long, 2.3–2.5 mm diam.; largest hairs widely spreading (with some directed downwards), *c.* 5 mm long; mature seed not seen.

*Diagnostic characters*. Distinguished from all other members of the genus in having the following combination of characters: simple, terete leaves and pale yellow flowers.

*Selected specimens examined*. WESTERN AUSTRALIA [localities withheld for conservation reasons]:

23 July 2001, *F. Hort* 1322 (PERTH); 26 Feb. 2003, *G.J. Keighery* 16418 (PERTH); 8 June 2006, *M. Morley & V. English* JP 1 (PERTH); 27 Apr. 2013, *K.R. Thiele* 4767 (PERTH).

*Distribution and habitat.* Occurs in sandy soils, often in *Banksia* woodlands, near the west coast of southern Western Australia in the Geraldton Sandplains, Jarrah Forest and Swan Coastal Plain bioregions. The distribution extends from Cockleshell Gully (north-east of Jurien Bay) south to Serpentine (Figure 1A).

*Phenology.* Flowers recorded primarily in the first half of the year, especially from February to May, and mature fruits recorded from March to May.

*Conservation status.* Currently listed as Priority Three under Conservation Codes for Western Australian Flora (Smith & Jones 2018). This species appears to be susceptible to dieback.

*Etymology.* From the Latin adjective *autumnalis* (autumnal) to reflect the species' unusual flowering period, which peaks in autumn. Most other species of *Isopogon* have their main flowering time in spring.

*Vernacular name.* Autumn Isopogon.

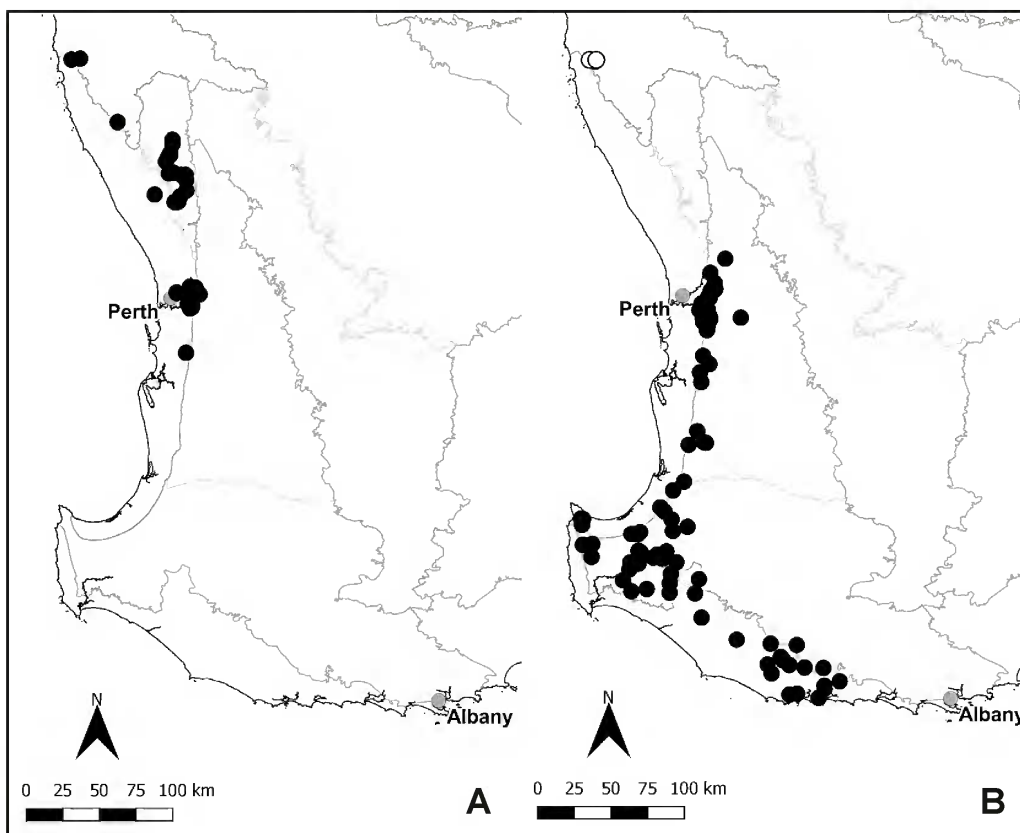


Figure 1. Distribution maps. A – *Isopogon autumnalis* (●); B – *I. sphaerocephalus* subsp. *lesueurensis* (○) and subsp. *sphaerocephalus* (●).

*Affinities.* This species seems very distinctive. It was placed in sequence between *I. longifolius* R.Br. and *I. villosus* Meisn. by Foreman (1995) but is unlikely to be confused with either of those species and its closest affinities are uncertain.

*Typification.* Foreman (1995: 204) listed Kew material of the Drummond syntype, which he had examined and confirmed as type material of *I. drummondii* on 12 January 1994, but did not list any material of the Preiss syntype. Three specimens of the *J. Drummond s.n.* syntype currently have images on *Global Plants*, two from the same Kew sheet annotated by Bentham and Foreman, and the other from the Natural History Museum (BM), but none of the Preiss syntype. A Preiss specimen that bears the “B” annotation indicating that it was seen by Bentham has been located at MEL (1531863); this specimen, is consistent with the syntype citation in lacking collection details,

We have selected one of the Drummond specimens, K 000736646, as the lectotype because it has two inflorescences and the date 1839, which accords well with the attribution to Drummond’s first collection. The other specimen on the same sheet, K 000736645, is from Hooker’s herbarium but has only one inflorescence and no date indicated, while the BM 000991907 specimen is not annotated by Bentham. The Preiss syntype at MEL was not chosen because it is in a poorer physical condition.

In the protologue for *I. drummondii* Benth., Bentham (1870: 345) lists the synonymy as ‘*I. petrophiloides*, Meissn. in Pl. Preiss. i. 503, and in DC. Prod. xiv. 276, partly, but not of Br.’, and notes ‘The foliage of the species is nearly that of the undivided states of *I. teretifolia* and *I. scabriuscula*, with the former of which (the *I. petrophiloides*, Br.) it may have been confounded by Meissner, as he quotes Baxter’s specimens as well as Drummond’s and Preiss’s.’ This note refers to a partial misapplication by Meisner (1845, 1856) of the name *I. petrophiloides* R.Br. to Bentham’s new species *I. drummondii* Benth. in regard to Meisner’s citation of two numbered Preiss specimens (679, 680) and an un-numbered Drummond first collection specimen. These are all represented in the de Candolle *Prodromus* herbarium at Geneva (G-DC; International Documentation Centre 1962). It is possible that the un-numbered Preiss syntype at MEL is a duplicate of one of the numbered specimens cited by Meisner under *I. petrophiloides*, but evidently its number had been lost before Bentham saw it.

*Notes.* A description of *I. autumnalis* [as *I. drummondii* Benth.] was given in the *Flora of the Perth Region* (Rye 1987). Later, the species was treated for some time as *I. drummondii* Hügel ex Jacques. See the discussion above and below outlining why the latter name is now considered likely to be a synonym of *I. sphaerocephalus*.

**Isopogon sphaerocephalus** Lindl., *Sketch Veg. Swan R.* 34 (1840); *Atylus sphaerocephalus* (Lindl.) Kuntze, *Revis. Gen. Pl.* 2: 577 (1891). *Type:* Swan River district [Western Australia], 1839, *J. Drummond s.n.* (*lecto:* CGE [image PERTH 01553976!], *fide* D.B. Foreman, *Flora of Australia* 16: 480 (1995); *isolecto:* GH 00035491 image!, MEL 672802 image!).

*Shrubs* 0.3–2 m high, 0.3–1.5 m wide. *Young stems* with long patent hairs and more numerous very short coiled hairs. *Leaves* sessile, erect, simple, linear to narrowly obovate, 50–160 mm long, 4–18 mm wide, with a somewhat obtuse, mucronate apex; margins tending to be recurved throughout their length, entire; mucro erect, triangular, 1.2–1.6 mm long, dark-coloured but the tip sometimes pale or the whole mucro covered by appressed, whitish hairs. *Flower heads* solitary or crowded with one or two others at end of a stem, erect, ± globular, commonly 25–30 mm diam., with numerous, densely packed involucrel and floral bracts, and subtended by very short leaves that grade into the much larger leaves below; bracts hidden when head is in full flower, very densely hairy outside with long whitish hairs. *Tepals* 10–15 mm long, cream to moderately deep yellow, usually pale yellow, separating down to the base of the pollen

presenter, which extends slightly below the base of the limb; claw glabrous throughout or with few hairs at the summit; limb 3.5–4 mm long, densely hairy with widely spreading, white hairs 0.7–2 mm long, the four parts of the limb becoming strongly curved after separating from one another. *Anthers* 2.2–2.8 mm long including terminal appendage; connective appendage 0.4–0.6 mm long, becoming dark. *Pollen presenter* 2.3–5 mm long, with an obvious constriction between the pedestal and swelling; pedestal 0.4–2 mm long, densely covered by hair-like or elongated papillae up to 0.25 mm long, which may protrude along four main longitudinal ridges to form four thick rows; swelling 0.35–0.55 mm wide; receptor 1.4–2.2 mm long, usually without papillae. *Cones* ovoid to cylindrical at first but often becoming broader when diaspores are shed; involucre bracts narrowly ovate, 7–8 mm long, attenuate or with a long apical point, with similar indumentum to the cone scales. *Cone scales* ovate or broadly ovate, as long as, or somewhat shorter than, involucre bracts; outer surface very densely hairy, with spreading hairs up to 2.2 mm long; inner surface glabrous; apical point hairy or becoming glabrous and dark. *Diaspores* ovoid, 3.5–5.3 mm long, 1.8–2.4 mm diam.; largest hairs widely spreading (with some directed downwards), 5–7 mm long; seed c. 3 mm long, c. 2 mm wide.

*Diagnostic features.* Distinguished from all other members of the genus by the following combination of characters: leaves linear to narrowly obovate, entire, with an erect mucro but with margins tending to recurved throughout their length; tepals usually pale yellow, with a glabrous claw and hairy limb.

*Notes.* An unusual characteristic of *I. sphaerocephalus* is its tendency to have slightly to markedly recurved leaf margins from the base to the apex. The closest approach to the fully recurved leaf margins of *I. sphaerocephalus* is in *I. cuneatus*, which has the base more or less flat or slightly incurved to slightly recurved. Other species of *Isopogon* have the leaf margins flat or incurved to meeting on the upper surface, or have the lamina recurved only distally.

Two geographically separated subspecies are recognised here.

#### **a. *Isopogon sphaerocephalus* Lindl. subsp. *sphaerocephalus***

?*Isopogon drummondii* Hügel ex Jacques, *Ann. Fl. Pomone* ser. 2, 1: 216 (1843) [as *Drumundii*]. *Type citation*: ‘Lieu originaire, la Nouvelle-Hollande’.

*Isopogon eriocladius* Gand., *Bull. Soc. Bot. France* 66: 228 (1919). *Type*: near Serpentine, Darling Range, Western Australia, September 1900, *W.V. Fitzgerald s.n.* (syn: LY n.v., fide D.J. McGillivray, *Contr. New South Wales Natl. Herb.* 4: 344 (1937)).

*Isopogon ovoideus* Gand., *Bull. Soc. Bot. France* 66: 228 (1919). *Type*: Smith’s Mill, Darling Range, Western Australia, September 1900, *A. Morrison s.n.* (holo: LY (two pieces mounted on same sheet) n.v., fide D.J. McGillivray, *Contr. New South Wales Natl. Herb.* 4: 344 (1937)).

*Illustrations.* A.S. George, *Intr. Proteaceae W. Australia* 83, Plate 123 (1984); N.G. Marchant, J.R. Wheeler, B.L. Rye, E.M. Bennett, N.S. Lander & T.D. Macfarlane, *Fl. Perth Region* 1: 347, Figure 125 (1987); W.E. Blackall & B.J. Grieve, *How Know W. Austral. Wildflowers* 1: 144 (1988); D.B. Foreman, *Fl. Australia* 16: frontispiece & 220, Figure 103I (1995); J.R. Wheeler, N.G. Marchant & M. Lewington, *Fl. South West* 2: 838 (2002) [all as *I. sphaerocephalus*].

*Shrubs* 0.3–2 m high, lignotuberosus. *Flowering branches* moderately to densely leafy, moderately to densely hairy. *Leaves* 50–160 mm long, 4–12 mm wide, glabrous or sparsely hairy. *Tepals* 10–15 mm long. *Pollen presenter* 2.3–3.3 mm long, with papillae 0.15–0.25 mm long on approximately the basal



third of the presenter; pedestal 0.4–1 mm long; swelling usually glabrous, sometimes with some very short papillae on the base, rarely with long papillae on one side only. *Diaspores* 3.5–4 mm long, *c.* 2.2 mm wide; largest hairs 5–6 mm long; seed *c.*  $2.8 \times 1.8$  mm.

*Selected specimens examined.* WESTERN AUSTRALIA: McCorkill Forest Block, 22 km WNW of Nannup, 11 Nov. 2009, *R.J. Cranfield* 2441 (PERTH); reserve near corner of Hardey Rd and Strettle Rd, Glen Forrest, 15 Sep. 2008, *K.R. Thiele* 3688 (PERTH).

*Distribution and habitat.* This subspecies extends from near Gidgegannup (north-east of Perth) south to the Scott River area and south-east to near Kent River (Figure 1B), in lateritic areas with Jarrah forest, sometimes associated with watercourses. This distribution extends through near-coastal parts of the far south-west of Western Australia, in the Jarrah Forest, Swan Coastal Plain and Warren bioregions.

*Phenology.* Flowers and fruits recorded more or less throughout the year but with the main flowering season apparently from July to December.

*Common name.* Drumstick Isopogon.

*Conservation status.* Not considered to be at risk.

*Synonyms.* McGillivray (1973: 344) identified *I. eriocladus* Gand. and *I. ovoideus* Gand. as synonyms of *I. sphaerocephalus* after examining type material, which in both cases he considered to be holotypes. In the case of *I. eriocladus*, it appears likely that Gandoger saw only material of one kind, and only on a single sheet now housed at LY, which can therefore be assumed to be the holotype. However, for *I. ovoideus* McGillivray stated ‘The type sheet bears two specimens, one in flower (on the right), the other in fruit.’ In this case the type material possibly should be regarded as two syntypes rather than a holotype.

The protologue of *I. drummondii* Hügel ex Jacques (Jacques 1843) describes the leaves as sparsely distributed, undivided, linear, sessile, 60–150 mm long [as 6–15 cm] and somewhat obtuse with a rather long, white point at the apex. This description of the leaves matches that given above for *I. sphaerocephalus* although the colour of the leaf point is usually dark. However, the tip is sometimes pale and sometimes covered by appressed whitish hairs.

It is evident from the original text that the description of *I. drummondii* Hügel ex Jacques was based on glasshouse-grown specimens. In addition to giving the native country for each as ‘la Nouvelle-Hollande’, Jacques (1843: 217) stated that this was one of six species he had described that were cultivated by Monsieur Martine’s establishment. Apparently the plants of *I. drummondii* were derived from a plant catalogue from Hügel’s garden and nursery business at Hietzing near Vienna, Austria (‘EUGEL cat. a.’, interpreted here as Hügel’s annual catalogue) under the manuscript name *I. ‘Drumundii’* (Jacques 1843: 216). In view of the epithet, it may be assumed that the original source of seed was collected by James Drummond from south-western Australia.

As is typical for Jacques’s names for Australian plants, there is no known herbarium specimen that can be connected with his *I. drummondii*. We are aware of only one case of a specimen associated, albeit indirectly, with a Jacques name, that of the doubtful name *Acacia semperflorens* Jacques (see Maslin 2001; O’Leary 2007); that specimen is housed at the Florence Herbarium (FI) and came from the same garden (Jacques 1837) that was cited in the description of *I. drummondii* Hügel ex Jacques. In response to our enquiries, we were informed that there are no relevant specimens of *Isopogon* at FI (C. Nepi, pers. comm.). Despite the lack of any original material, we are confident that the protologue

is sufficient to show that it is not the same species as *I. drummondii* Benth..

*Notes.* The diaspore and seed measurements given above are based on diaspores from only a few specimens. From the available samples it seems likely that subsp. *lesueurensis* tends to have larger diaspores than subsp. *sphaerocephalus* but further fruiting material is needed to check this.

**b. *Isopogon sphaerocephalus* subsp. *lesueurensis* Rye, subsp. nov.**

*Typus:* Mount Lesueur area, Western Australia [precise locality withheld for conservation reasons], June 1931, C.A. Gardner s.n. (*holo:* PERTH 03439380).

*Shrubs* 0.5–1.5 m high, probably lignotuberous. *Flowering branches* densely leafy, densely or very densely hairy. *Leaves* 60–100 mm long, 7–18 mm wide, densely or moderately densely hairy. *Tepals* 13–15 mm long. *Pollen presenter* 3.5–5 mm long, with finger-like papillae 0.2–0.25 mm long on the basal half of presenter; pedestal 1.5–2 mm long; swelling with long papillae on both sides or rarely just on one side and with short papillae on the other side, also often with papillae extending upwards for a short distance onto the base of the receptor. *Diaspores* 4–5.3 mm long, 1.8–2.4 mm wide; largest hairs 6–7 mm long; seed *c.* 3.2 × 2.2 mm.

*Diagnostic features.* Distinguished from subsp. *sphaerocephalus* mainly by its longer pollen presenter (3.5–5 mm *cf.* 2.3–3.3 mm long), including a pedestal 1.5–2 mm long (*cf.* 0.4–1 mm long) and with long papillae on the lower half including the swelling above the pedestal (*cf.* long papillae extending for less than half the length of the pollen presenter, with the swelling usually glabrous or just with a few short papillae at the base). Plants of this subspecies also tend to be more hairy on their vegetative parts and to have more densely arranged, broader leaves (7–18 mm *cf.* 4–12 mm wide).

*Selected specimens examined.* WESTERNAUSTRALIA [localities withheld for conservation reasons]: 25 Aug. 1938, W.E. Blackall 3627 (PERTH); June 1931, C.A. Gardner s.n. (PERTH); 27 Aug. 1979, E.A. Griffin 1980 (PERTH); 26 Sep. 1976, R.W. Johnson 3285 (BRI n.v., PERTH).

*Distribution and habitat.* Occurs in lateritic soils, recorded on the top of one hill and from the slopes and base of mesas, in the Mt Lesueur area (Figure 1B), north-east of Jurien Bay in the far south of the Geraldton Sandplains bioregion of Western Australia. No details of the vegetation are given but presumably this subspecies occurs in the shrublands with a high species diversity that characterise the lateritic uplands of the Mt Lesueur area. Subspecies *lesueurensis* occurs in a drier habitat and is separated by a disjunction of about 180 km from the northernmost locality known for subsp. *sphaerocephalus*.

*Phenology.* Flowers recorded from June to early November and fruits continuing to February.

*Conservation status.* To be listed under Conservation Codes for Western Australian Flora as Priority Two (A. Jones pers. comm). This subspecies has a very restricted range, being known only from three hills over a distance of a few kilometres.

*Etymology.* Named after the Mt Lesueur area where the taxon occurs. This area has a high biodiversity and includes several other endemic taxa, such as *Grevillea batrachioides* McGill. and *Hypocalymma tenuatum* Strid & Keighery.

*Common name.* Lesueur Isopogon.

*Notes.* The earliest collection of this subspecies was made by Charles Gardner in June 1931. One of Gardner's specimens (PERTH 01904957) bears the manuscript name *I. longifolius* var. 'villosa' and another gathering was recorded in his collecting book as *I. sp. aff. sphaerocephalus* but he made no mention of the taxon in his unpublished flora treatment\*. Foreman (1995: 218) described this variant of *I. sphaerocephalus* as 'a broad, hairy leaf form'.

One flowering specimen (PERTH 03418626) labelled as having been collected by Gardner from Mt Lesueur in January 1940 is of the typical subspecies and does not match a second specimen labelled with the same details (PERTH 01904957), which is in fruit. There appears to have been a mislabelling of the former specimen. Perhaps the confusion in the labelling of specimens contributed to Foreman's (1995: 218) note that the Mt Lesueur variant seemed to intergrade with the typical variant. Although some of the individual characters may show some overlap between the two subspecies, possibly mainly because of seasonal variation in most cases, there are no known specimens that cannot be conclusively identified to the subspecies level.

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Digital images of types not available at PERTH were examined using JSTOR's *Global Plants* database (<https://plants.jstor.org/>). We are grateful to Dr Chiara Nepi (University of Florence) for her advice regarding specimens at FI, the Collections staff at MEL for information and specimen scans, Anna Monro and Kelly Shepherd for their helpful comments on the manuscript, and Steve Dillon for assistance with the distribution maps.

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\*This was prepared during the 1930s for his proposed *Flora of Western Australia*. However, only the first part of Volume One, on grasses (Gardner 1952), was ever published.